



**US Army Corps
of Engineers**



***Draft 2009 Kelt Management
Plan***

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- Draft completed Dec 2009
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Table 1. Per Cent Iteroparity for Various Steelhead Populations in the Columbia Basin and Washington Coastal Basins

- Columbia River (Pre-Bonneville) 2-12% Long and Griffin 1937
- Quinault River/Washington Coast 11.6% (3.2-32.5%) L. Gilbertson (Quinault Tribe) Personal Com.
- Queets River/Washington Coast 22.9% (13.5-35.0%) L. Gilbertson (Quinault Tribe) Personal Com.
- Lower Columbia Tributaries Exceeding 17% NMFS (1996)
- Hood River/Hood 4.6% J. Newton (ODFW) Personal Com.
- Klickitat River/Klickitat 3.3% Howell et al. (1985)
- Clearwater River/Snake 2-4% (Estimated) Whitt (1954)
- Yakima River/Yakima 1.6% (Average) Hockersmith et al. 1995
- SF Walla Walla/Walla Walla 2-9% J. Germond (ODFW) Personal Com.
- Mid/Upper Columbia 1.6% (Average) L. Brown (WDFW) Personal Com.
- Snake Basin 3.1% Costello (1977)

Draft 2009 Kelt Management Plan

- RPA Action #33 requires the Corps and the BPA to “prepare a Snake River Kelt Management Plan (Plan) in coordination with NOAA Fisheries and the Regional Forum. BPA and the Corps will implement the plan to improve the productivity of interior basin B-run steelhead populations as identified in Sections 8.5.”

RPA #33 requires a Plan that will focus on the wild component of the B-run steelhead and should include:

- Measures to increase the in-river survival of migrating kelts,
 - Potential for collection and transport (either with or without short-term reconditioning) of kelts to areas below Bonneville Dam,
 - Potential for long-term reconditioning as a tool to increase the number of viable females on the spawning grounds, and
 - Research as necessary to accomplish the plan elements.
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- increase the number of returning Snake River B-run steelhead spawners to Lower Granite Dam by about 6% (Supplemental Comprehensive Analysis Steelhead Kelt Appendix- Bellerud et al. 2007)

Draft 2009 Kelt Management Plan

- RPA Action #42 requires Action Agency funding of steelhead kelt reconditioning programs for middle and upper Columbia River steelhead populations. RPA #42 requires:
- Funding a program to recondition natural origin kelts for the Entiat, Methow and Okanogan subbasins (Upper Columbia) including capital construction, operation, and monitoring and evaluation costs; and
- Funding a program to recondition natural origin kelts in the Yakima subbasin (Mid-Columbia) including capital construction, implementation, and monitor and evaluation costs.
- Unlike RPA #33, RPA #42 does not specify a numerical target for an increased number of returning steelhead spawners; it only mandates funding for hatchery based reconditioning programs that conserve and build genetic resources for the recovery of ESA listed steelhead populations in the Upper and Middle Columbia Distinct Populations Segments (DPS). Similar population-level benefits could be expected for the Mid- and Upper Columbia DPS per employment of collection & transportation, kelt reconditioning, and in-stream improvements, assuming logistical difficulties associated with collection of kelts at the hydro projects can be resolved (Chapter 8.5, FCRPS Biological Opinion, 2008).

1. **RPA 50.5**- Provide additional status monitoring to ensure a majority of Snake River B-Run steelhead populations are being monitored for population productivity and abundance (Initiate by FY 2009, then annually)
2. **RPA 53.5** - Evaluate operation of the Bonneville PH2 corner collector from March 1 through start of spill as a potential means to provide a safer downstream passage route for steelhead kelts, and implement if warranted.
3. **RPA 54.13** - Evaluate operation of The Dalles Dam sluiceway from March 1 – March 31 and from December 1 – December 15 as a potential means to provide a safer fallback passage route for overwintering steelhead and kelts, and implement if warranted.
4. **RPA 64.1**- Continue to estimate the relative reproductive success (RSS) of hatchery – origin salmon and steelhead compared to reproductive success of their natural-origin counterparts for ESA-listed spring/summer Chinook population in the Upper Grande Ronde, Lostine River, and Catherine Creek; listed spring Chinook in the Wenatchee River; and listed steelhead in the Hood River. Continue to fund the ongoing RRS feasibility study for Snake River fall Chinook to completion in 2009 (Initiate in FY 2007-2009 Projects).

- The Kelt Management Plan for 2009 is primarily intended to be an informational document in nature, and will serve as a foundation for the generation and adaptation of future Kelt Management Plans.
- Successive plans will necessarily be more detailed in content, in order to fully meet the mandates of RPA #33.
- The objectives of this initial version of the Kelt Management Plan are chiefly to (1) provide a synopsis of current understanding about operational and kelt reconditioning measures employed to benefit kelt survival and iteroparity (repeat spawning) in the Snake and Columbia Rivers, (2) identify critical uncertainties/data gaps and (3) recommend strategies to increase kelt survival/ iteroparity rates and ultimately the abundance of steelhead populations.

- Keefer et al. (2008) reported that kelts in good or fair condition were > 25 and > 10 times respectively more likely to return as repeat spawners than those in poor condition. They also reported that early-timed emigrating, bright colored, wild and smaller bodied kelts were also significantly more likely to return as repeat spawners.
- During the 2001-2005 period, the emigration time for steelhead kelts through the hydro projects (Lower Granite, McNary, and John Day) occurred from mid-March through early June (Keefer et al. 2008). In 2001-2004 kelt studies, earlier emigrating kelts returned at relatively higher rates than later emigrants (Boggs et al. 2008). 'Consecutive' spawners (returning year after kelt emigration to estuary/ocean) appear to emigrate earlier as kelts than 'skip' spawners (remain in ocean one or more years longer than 'consecutive' spawners) (Keefer et al. 2008).

Overall Summary



**2000 kelts passed McNary and John Day
passes in 2001.**

**Spill significantly reduces kelt passage
times and travel times between projects**

Surface flow bypass shows good potential

**Wild, bright kelts in good condition make
rough the survival gates and return**

- Passage evaluations at dams generally indicate that surface-oriented passage routes at hydro projects provide the best passage efficiency and are assumed to have higher survival rates. Conversely, turbine intakes, typically deeper in the water column, appear to be associated with the highest kelt mortality rates. The effects of passage over spillways are unknown (Evans et al. 2008) due to a lack of PIT- and other tag studies.

- Operational Strategies
 - *Enhanced In-river Migration*
 - Collection and Transportation
-
- Kelt Reconditioning Strategies
 - *In-River Migration*
 - Transport Only (Without Reconditioning)
 - *Short-Term Reconditioning*
 - *Long-Term Reconditioning*

RECOMMENDATIONS AND ACTIONS TO BE IMPLEMENTED IN 2010

- In order to increase knowledge of kelt reconditioning, while implementing and studying operations to improve the in-stream migration of kelts, the action agencies will execute the following actions in 2010:
- **Actions to Enhance In-river Survival**
 - Continued study of kelt passage at The Dalles dam by evaluating the operation of the ice and trash sluiceway beginning March 1, 2010 (41 days prior to the commencement of juvenile fish spill on April 10).
 - Continue consideration of a potential early operation of the Bonneville Dam Powerhouse 2 Corner Collector in March if kelt abundance is found sufficient to warrant the operation.
 - Investigate potential priority to B1 in March on an interim basis.
 - Continued operation of surface passage outlets on all 8 federally owned mainstem dams on the lower Columbia and Snake Rivers consistent with BiOp (or Court Ordered) spill dates for the juvenile migration.
 - Continue the implementation of an analysis to investigate kelt transportation from Lower Granite Dam
 - PIT Tagging of kelts collected at Lower Granite Dam to assess future return rates of kelts that were returned to migrate in-river and those that are transported as part of the CRITFC efforts in 2010.
- **Actions to Enhance Kelt Reconditioning Efforts**
 - Continued funding of Snake River kelt reconditioning research
 - Continued funding of upper Columbia River and mid- Columbia reconditioning research
 - Complete the construction of temporary kelt holding facilities at Lower Granite Dam

4% (21/[21+12]) =

GE (guided/[guided + unguided

The Dalles
Ice-trash sluice



An aerial photograph of a large dam and river system, likely the Bonneville Dam. The river flows from the top left, through the dam, and curves to the right. The surrounding landscape is green and hilly. Overlaid on the image are statistics and a diagram. The text '14%' is in the upper left, '23%' is in the center, and '63%' is to the right of the center. An orange double-headed arrow points between the '23%' and '63%' values. At the bottom, a large line of text reads '3% (133/2112) of released elts contacted at BON'.

14%

23%

63%



3% (133/2112) of released elts contacted at BON

- Kelt reconditioning projects in 2010 will continue to address critical unknowns and data gaps identified throughout this document. Specifically in 2010, BPA project 2007-401-00 will attempt to: 1) evaluate the reproductive success of artificially spawned kelts in Omak Creek and the Warm Springs River, 2) evaluate and compare reconditioning rates between Omak Creek, Yakima River, Warm Spring River, and the Clearwater River, 3) continue to develop the background science needed to address critical uncertainties surrounding appropriate reconditioning duration and whether combining transportation provides additional benefits, and 4) evaluate the progeny and gamete viability of post-spawned kelts. Results from this research will directly inform future kelt management plans and will become the base for long term kelt reconditioning efforts.

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